

REMARKS

The specification has been amended as noted above. Accordingly, claims 1-9 remain for consideration in this application.

Figs. 5(a) and 5(b) are objected to as not being labeled "Prior Art".

Corrected Figs. 5(a) and 5(b) (including the proper labeling of "Prior Art") have already been submitted along with Applicants' Preliminary Amendment dated May 18, 2007.

The title is objected to as not being descriptive.

The previous title has been cancelled in place of the following new title:

A MOVING MAGNET TYPE LINEAR ACTUATOR HAVING A MAGNETIC
BACK YOKE FIXED WITH RESPECT TO A STATOR UNIT.

The specification is objected to because of the informalities noted on pages 2 and 3 of the Office Action.

It should be noted that a Substitute Specification was submitted along with the Preliminary Amendment dated May 18, 2007. The informalities objected to in the Office Action with regard to paragraphs [0002] and [0011] have already been corrected in the Substitute Specification. The objection with regard to paragraph [0012] is now amended, as set forth above, on page 7 of the Substitute Specification.

Claims 1-7 and 9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuboi (Pub. No. US 2001/0048249) in view of Moczala (USP 4,581,553) and Kelly (USP 5,703,417).

Tsuboi is directed to a sliding unit (sliding means) 1 having a built-in moving magnet linear motor. An elongated steel bed 2 supports an armature assembly 10. Armature assembly

10 includes coil board 11 and armature windings 12. Additionally, track rails 5 are supported upon elongated steel bed 2. The sliding unit 1 has sliders 6 slidably engaged with track rails 5. The sliders 6 are fixed to steel table 3. Also, field magnet 13 is fixed to steel table 3, and is disposed in opposition to armature assembly 10 of the elongated steel bed 2.

The Office Action indicates that Tsuboi does not expressly disclose a magnetic back yoke forming a magnetic second gap between it and the field permanent magnet, or that the second gap is larger than the first, or that the magnet holder is made of a nonmagnetic material.

Moczala discloses a linear motor having an increased force-to-velocity ratio. As best illustrated in Fig. 4, Moczala discloses stacks 1 and 2 of iron laminations with respective windings 5 and 6. Further, stacks 1 and 2 are provided with pole teeth 9. The unwound motor part comprises a yoke or flux-return structure made up of two toothed parts 7 and 8, which are connected to one another by a connecting part. Permanent magnets 3 and 4 are disposed in the longitudinal direction of stacked core 1, 2. A magnetic back yoke 7 (equivalent to an inductor) has the toothed section 9 positioned opposite the armature through a magnetic gap.

It is the position of the Office Action that Moczala teaches a magnetic back yoke 7 arranged on an anti-armature side. The Office Action also suggests that Moczala describes a second gap between the magnetic back yoke and the field permanent magnet.

Kelly is simply cited to show a magnetic holder 1a (see Fig. 1) which is made of a nonmagnetic material, as noted in column 4, lines 1 and 2.

The instant invention, includes a moving magnet type linear actuator with a long life and which eliminates the effects of high frequency acceleration/deceleration motion on a linear guide.

More specifically, the invention of claim 1 is illustrated in Figs. 1(a), 1(b), and 4, which show a structure making the second magnetic gap [gb] longer than the first magnetic gap [ga] in a moving magnet type linear actuator 10 comprising a magnetic back yoke 39 arranged at an anti-armature side of the field permanent magnet 21 through magnetic second gap [gb] and provided with a stator unit 30 having a stator base 31 and an armature unit 32 and magnetic core 33; a field permanent magnet 21 positioned opposite magnetic core 33 through magnetic first gap [ga]; a moving unit 20 having nonmagnetic magnet holder 22 movably disposed on top of a stator base 31 and supporting field permanent magnet 21.

Comparing the present invention and Tsuboi, there is no mention in Tsuboi of a structure having a movable table 3 (equivalent to the magnet holder of the present invention) made of non-magnetic material and which secures a magnet capable of field [production] and a movable magnet provided with a magnetic back yoke via a magnetic gap (second gap), as in the present invention.

Compared to the structure of instant claim 1, Moczala has a structure provided with armature winding 5, 6 between permanent field magnets 3, 4 and the magnetic back yoke 7, and the present invention has a different structure, which is provided with permanent field magnet between the armature winding and the magnetic back yoke. Therefore, Moczala does not have the structure of the present invention with a magnetic second gap between permanent field magnets 3, 4 and magnetic back yoke 7.

Thus, Moczala device does not show the “magnetic back yoke” set forth in claim 1. Specifically, claim 1 recites:

...a magnetic back yoke is arranged at an anti-armature side of the field permanent magnet, ...

This means that the field permanent magnet is disposed between the armature and the magnetic back yoke. If Fig. 4 of Moczala is cited in the Office Action to show this structure, it does not show it. In Fig. 4, the armature windings 5 are in between magnet 4 and upper yoke part 7. This is not a similar structure to that of claim 1.

Additionally, claim 1 requires:

...longitudinal ends of the magnetic yoke being secured to the stator unit, ...

If the Office Action suggests that the “magnetic back yoke” of the claims refers to the upper yoke part 7 of Moczala, it is clearly movable with regard to the armature windings 5. This is not the same as the claimed structure where the “longitudinal ends” of the magnetic back yoke are secured to the stator unit. This is simply not shown in Moczala.

Thus, the features of claim 1, including a structure making the second magnetic gap [gb] longer than the first magnetic gap [ga] in a moving magnet type linear actuator comprising a magnetic back yoke arranged at an anti-armature side of the field permanent magnet through magnetic second gap [gb] and provided with a stator unit having a stator base and an armature unit and magnetic core; a field permanent magnet positioned opposite magnetic core through magnetic first gap [ga]; a moving unit having nonmagnetic magnet holder movably disposed on top of a stator base and supporting field permanent magnet are neither disclosed, nor suggested by, Moczala, Kelly, or Tsuboi, individually or combined.

Accordingly, in view of the remarks above, since even the combination of Tsuboi with Moczala and Kelly does not disclose, nor does it suggest the requirements recited in claim 1, claim 1 cannot be obvious over the above cited references. Accordingly, it is respectfully requested that the rejection of claim 1 be withdrawn. Furthermore, claims 2-7 and 9 are dependent, directly or indirectly, from claim 1 and limited to the additional features set forth therein. Accordingly it is also submitted that said dependent claims are not obvious for the reasons set forth above with regard to claim 1.

Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuboi, Moczala, and Kelly, and further in view of Chitayat (USP 5,783,877).

Chitayat simply discloses a conduit for forced cooling. However, claim 8 is dependent, directly or indirectly, from claim 1, and limited to the additional features set forth therein. Accordingly, claim 8 cannot be obvious over the above references, for the same reasons as set forth above with regard to claim 1.

Accordingly, in view of the remarks set forth above, and the amendment to the specification and title, Applicants submit that the rejections and objections have been overcome. Accordingly it is respectfully requested that the rejections and objections be withdrawn and that claims 1-9 be allowed.

Application No.: 10/582,944
Art Unit: 2834

Amendment under 37 C.F.R. §1.111
Attorney Docket No.: 062528

CONCLUSION

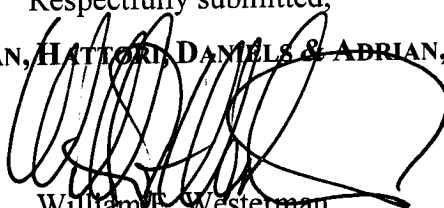
In view of the foregoing amendments and accompanying remarks, it is submitted that all pending claims are in condition for allowance. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are earnestly solicited.

If the Examiner believes that there are issues remaining to be resolved in this application, the Examiner is invited to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite and complete prosecution of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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